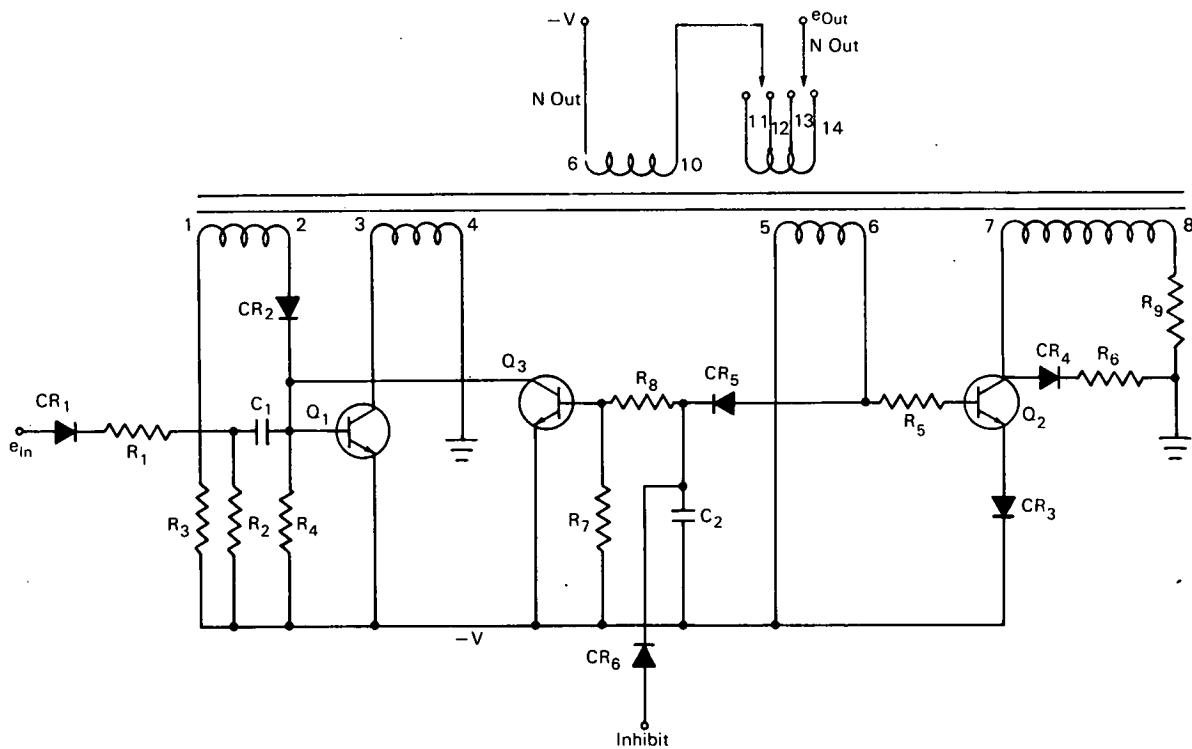


NASA TECH BRIEF



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One-Shot Pulse Shaper Circuit



The problem:

Previously designed pulse shapers dissipate large amounts of power so that a long counting chain uses as few shapers as possible. This leads to temperature problems that are caused by energy losses in the coupling transistors that isolate scaler stages.

The solution:

A pulse shaper circuit that is basically a magnetic one-shot multivibrator consisting of two blocking oscillators and an inhibit circuit and that exhibits low power dissipation, self setting, and easy triggering.

How it's done:

The input stage, consisting of CR₁, R₁, and R₂ is capacitively coupled to the base of Q₁ through C₁ to prevent drawing excessive power from it. The first blocking oscillator is made up of Q₁, N₁₋₂, N₃₋₄, R₃, R₄, and CR₂. When e_{in} goes high, Q₁ turns on and the first blocking oscillator begins to switch the core. Positive feedback from N₃₋₄ to base of Q₁ via N₁₋₂ keeps the blocking oscillator on until the core saturates. The second blocking oscillator consists of Q₂, N₅₋₆, N₇₋₈, R₅, R₆, CR₃, and CR₄. After the core has

(continued overleaf)

saturation, Q₁ cuts off causing the voltage across N₃₋₄ to reverse polarity, thus inducing a voltage in N₅₋₆ that turns off Q₂. The second blocking oscillator then turns on and resets the core.

The inhibit circuit consists of Q₃, R₇, R₈, CR₅, CR₆, and C₂ and inhibits the first blocking oscillator from turning on when the second blocking oscillator turns off. When Q₂ turns off, Q₃ is kept on by the discharge of C₂ through R₈ for a few microseconds, thereby inhibiting Q₁ and preventing the pulse shaper from oscillating. Coils N₁₁₋₁₂, N₁₂₋₁₃, and N₁₃₋₁₄ are used to fine-adjust the output coil N₉₋₁₀. An inhibit input is provided at CR₆ where a positive input prevents the pulse shaper from turning on.

Notes:

1. Because of its low power requirements, this pulse shaper can be used to buffer each subchain of three scalers. This contributes to ease in packaging and minimizes temperature and trimming problems.

2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland 20771
Reference: B68-10012

Patent status:

No patent action is contemplated by NASA.

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